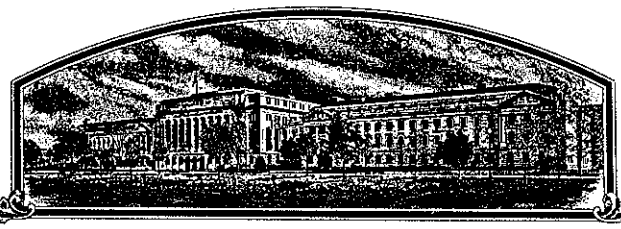
No. 8800125



THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Nickerson American Plant Breeders, Inc.

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF eighteen YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

SOYBEAN

'AP 3977'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D. C. this 31st day of January in the year of our Lord one thousand nine hundred and eighty-nine.

Attest:

Kenneth A. Evans
Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Clayton Yeutter
Secretary of Agriculture

APPROVAL EXPIRES 2-28-88

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions on reverse)

FORM APPROVED: OMB NO. 0581-0055

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S)	2. TEMPORARY DESIGNATION	3. VARIETY NAME
Nickerson American Plant Breeders		AP 3977

4. ADDRESS *(Street and No. or R.F.D. No., City, State, and Zip Code)*	5. PHONE *(Include area code)*	FOR OFFICIAL USE ONLY
5201 Johnson Drive P.O. Box 2955 Mission, KS 66205	(913) 384-4940	PVPO NUMBER 8800125

6. GENUS AND SPECIES NAME	7. FAMILY NAME *(Botanical)*	FILING
Glycine max	Leguminosae	DATE: April 13, 1988 TIME: 1:30 ☐ A.M. ☑ P.M.

8. KIND NAME	9. DATE OF DETERMINATION	FEES RECEIVED
Soybean	January 1984	AMOUNT FOR FILING: $ 1800 00 DATE: March 17, 1988 AMOUNT FOR CERTIFICATE: $ 200 00 DATE: Nov. 7, 1988

10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION *(Corporation, partnership, association, etc.)*	11. IF INCORPORATED, GIVE STATE OF INCORPORATION	12. DATE OF INCORPORATION
Corporation	Delaware	April 1, 1983

13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS

Wayne Ellingson, Director of Oilseeds Research
AgriPro Seeds
R.R. #2, Hwy 30 East
Ames, IA 50010

PHONE *(Include area code)*: (515) 232-0691

14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED

a. ☒ Exhibit A, Origin and Breeding History of the Variety *(See Section 52 of the Plant Variety Protection Act.)*
b. ☒ Exhibit B, Novelty Statement.
c. ☒ Exhibit C, Objective Description of Variety *(Request form from Plant Variety Protection Office.)*
d. ☐ Exhibit D, Additional Description of Variety.
e. ☒ Exhibit E, Statement of the Basis of Applicant's Ownership.

15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? *(See Section 83(a) of the Plant Variety Protection Act.)* ☐ Yes *(If "Yes," answer items 16 and 17 below)* ☒ No

16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? ☐ Yes ☐ No

17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED? ☐ Foundation ☐ Registered ☐ Certified

18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.? ☐ Yes *(If "Yes," give date)* ☒ No

19. HAS THE VARIETY BEEN RELEASED, OFFERED FOR SALE, OR MARKETED IN THE U.S. OR OTHER COUNTRIES ? ☒ Yes *(If "Yes," give names of countries and dates)*

A small quantity, less than 500 bags, was sold in the U.S. during the spring of 1987. SOLD MAY 4, 1987. RJS 4/26/88

☐ No

20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in Section 41, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF APPLICANT	DATE
Wayne R. Ellingson	3/4/88
SIGNATURE OF APPLICANT	DATE

FORM LS-470 (3-86) *Edition of 7-84 obsolete.*

1

"EXHIBIT A"
ORIGIN AND HISTORY OF 'AP 3977'

1. AP 3977 originated in Indiana from a hand pollinated cross of 'Williams 79' and 'AgriPro 26.' The cross was made during the summer of 1979. The F1, F2, and F3 generations were grown in Brazil during the fall of 1979, winter 1979-80, and summer 1980, respectively. The F4 generation was grown in Puerto Rico during the winter 1980-81. Early generations were advanced using a modified single seed decent technique. Single plants of the cross were selected in the F4 generation and the seed was planted as a progeny row in Indiana the summer of 1981.

2. In 1983, single plants of the variety were reselected and grown in progeny rows in 1984. Only rows conforming to a standard were harvested and bulked. The genetic make-up of the variety was stabilized in the sixth generation (1983). The variety has remained stable since the reselection. The purpose of the re-selection was for beginning multiplication for seed stock production. The variety was not changed, but only the mixtures removed which occurred during yield testing.

3. AP 3977 has been yield tested since 1982. See attached for 1983-1987 data. AP 3977 has been tested under the experimental designations 79101-B81-01121 and EX 3977 or as AP 3977.

4. Discernible variants are not an inherent component of the variety.

"EXHIBIT B"

Novelty is based on the unique combination of the following characters:

AP 3977 is most similar to the varieties 'Williams 79' and 'Williams 82.' However, AP 3977 differs from both varieties in metribuzin tolerance and iron deficiency chlorosis resistance. In addition, AP 3977 differs from Williams 82 in Phytophthora root rot resistance.

1. AP 3977 is moderately sensitive to the broadleaf herbicide metribuzin, commercialized as Sencor and Lexone, where Williams 79 and Williams 82 are moderately tolerant and tolerant, respectively. Metribuzin tests were conducted using a technique developed by MoBay Corporation (see attached).

2. AP 3977 is resistant to iron deficiency chlorosis where Williams 79 and Williams 82 are susceptible.

3. AP 3977 possesses the Rps1-c gene for Phytophthora resistance where Williams 82 possesses the Rps1-k gene. The differences are as follows:
   Rps1-c = resistance to races 1-3, 6-11, 13, 15, 17, 21, 23, and 24.
   Rps1-k = resistance to races 1-11, 13-15, 17-18, 21-22, and 24. Race 23 reaction is unknown.

HYDROPONIC TECHNIQUE FOR SCREENING SOYBEAN VARIETIES FOR SENCOR TOLERANCE

I. MATERIALS

Material and container sizes can be any type and size that best suit your conditions. Materials used in our trials are:

A fabricated box measuring 36" width x 50" length x 7" depth (inside measurements) is lined with black polyethylene plastic sheeting. Forty gallons of one-half strength modified Hoagland's macro nutrient solution, and a full strength quota of micronutrient solution is the hydroponic media utilized in these trials.

Styrofoam panels (4' x 8' x 3/4") are cut to fit the tanks and are floated on the nutrient solution to support the plants. The panels are then cut in half (cross-wise) for ease of handling during periods when nutrient and chemicals are added. Styrofoam panels are then drilled using a 1/4" bit. There are 10 rows, on a 3½" spacing, of 12 holes per each of the two panels per tank (240 plants/tank).

II. SEEDLING TRANSPLANTING

Soybeans are germinated in vermiculite. After 4 days (under 80°F temperature) the seedlings are removed and roots washed free of vermiculite. The seedlings at this time are in the unopened cotyledon stage. Seedlings are then transplanted into the holes in the styrofoam panels. Generally, seedlings greater than 4 days old have started to produce lateral roots making it difficult to transplant into the ¼" hole.

III. TREATMENT

Generally, 10-12 days after transplanting, the soybean plants are in the expanded first trifoliate leaf stage. One of the panels is removed from the tank momentarily. The tanks are brought up the the original level of 40 gallons by adding full strength modified Hoagland solution. An alloquat of a SENCOR stock solution is added to the tank, throughly mixed, and the panel containing the soybean plants is replaced. The initial screening is conducted using a SENCOR concentration of 0.15 ppm or if sufficient tanks are

available, a rate series of 0.15, 0.20 and 0.25 ppm is utilized.

IV. EVALUATION

Approximately 2-3 days after treatment, SENCOR symptoms will become apparent. Evaluations are made 2-3 times during the 8-10 day testing period. Generally, after 8-10 days, the final evaluation is made by pulling and evaluating each plant individually. This method allows for observation and detection of plants, within a group of plants, that demonstrates a variable or selective tolerance to the treatment.

V. Ratings are based on the reactions of lines being tested compared to known check varieties grown in each hydoponic tank. The ratings are as follows:

Tolerant
Moderately Tolerant
Moderately Sensitive
Sensitive

FORM APPROVED: OMB NO. 0581-0055

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
LIVESTOCK, MEAT, GRAIN & SEED DIVISION
PLANT VARIETY PROTECTION OFFICE
BELTSVILLE, MARYLAND 20705

EXHIBIT C
(Soybean)

OBJECTIVE DESCRIPTION OF VARIETY
SOYBEAN (Glycine max L.*)*

NAME OF APPLICANT(S)	TEMPORARY DESIGNATION	VARIETY NAME
Nickerson American Plant Breeders		AP 3977

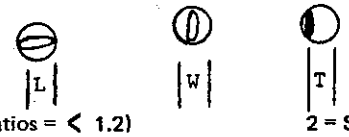
ADDRESS *(Street and No., or R.F.D. No., City, State, and Zip Code)*
5201 Johnson Drive
P.O. Box 2955
Mission, KS 66205

FOR OFFICIAL USE ONLY
PVPO NUMBER
8800125

Choose the appropriate response which characterizes the variety in the features described below. When the number of significant digits in your answer is fewer than the number of boxes provided, place a zero in the first box when number is 9 or less (e.g., [0][9]).

1. SEED SHAPE:

[2]



1 = Spherical (L/W, L/T, and T/W ratios = < 1.2)
2 = Spherical Flattened (L/W ratio > 1.2; L/T ratio = < 1.2)
3 = Elongate (L/T ratio > 1.2; T/W = < 1.2)
4 = Elongate Flattened (L/T ratio > 1.2; T/W > 1.2)

2. SEED COAT COLOR: (Mature Seed)

[1] 1 = Yellow 2 = Green 3 = Brown 4 = Black 5 = Other *(Specify)* _____

3. SEED COAT LUSTER: (Mature Hand Shelled Seed)

[2] 1 = Dull ('Corsoy 79'; 'Braxton') 2 = Shiny ('Nebsoy'; 'Gasoy 17')

4. SEED SIZE: (Mature Seed)

[1][8] Grams per 100 seeds

5. HILUM COLOR: (Mature Seed)

[6] 1 = Buff 2 = Yellow 3 = Brown 4 = Gray 5 = Imperfect Black 6 = Black 7 = Other *(Specify)* _____

6. COTYLEDON COLOR: (Mature Seed)

[1] 1 = Yellow 2 = Green

7. SEED PROTEIN PEROXIDASE ACTIVITY:

[2] 1 = Low 2 = High

8. SEED PROTEIN ELECTROPHORETIC BAND:

[2] 1 = Type A ($SP1^a$) 2 = Type B ($SP1^b$)

9. HYPOCOTYL COLOR:

[2] 1 = Green only ('Evans'; 'Davis') 2 = Green with bronze band below cotyledons ('Woodworth'; 'Tracy')
3 = Light Purple below cotyledons ('Beeson'; 'Pickett 71')
4 = Dark Purple extending to unifoliate leaves ('Hodgson'; 'Coker Hampton 266A')

10. LEAFLET SHAPE:

[3] 1 = Lanceolate 2 = Oval 3 = Ovate 4 = Other *(Specify)* _____

6

11. LEAFLET SIZE:

[2] 1 = Small ('Amsoy 71'; 'A5312') 2 = Medium ('Corsoy 79'; 'Gasoy 17')
3 = Large ('Crawford'; 'Tracy')

12. LEAF COLOR:

[2] 1 = Light Green ('Weber'; 'York') 2 = Medium Green ('Corsoy 79'; 'Braxton')
3 = Dark Green ('Gnome'; 'Tracy')

13. FLOWER COLOR:

[1] 1 = White 2 = Purple 3 = White with purple throat

14. POD COLOR:

[1] 1 = Tan 2 = Brown 3 = Black

15. PLANT PUBESCENCE COLOR:

[2] 1 = Gray 2 = Brown (Tawny)

16. PLANT TYPES:

[2] 1 = Slender ('Essex'; 'Amsoy 71') 2 = Intermediate ('Amcor'; 'Braxton')
3 = Bushy ('Gnome'; 'Govan')

17. PLANT HABIT:

[3] 1 = Determinate ('Gnome'; 'Braxton') 2 = Semi-Determinate ('Will')
3 = Indeterminate ('Nebsoy'; 'Improved Pelican')

18. MATURITY GROUP:

[6] 1 = 000 2 = 00 3 = 0 4 = I 5 = II 6 = III 7 = IV 8 = V
9 = VI 10 = VII 11 = VIII 12 = IX 13 = X

19. DISEASE REACTION: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant)

BACTERIAL DISEASES:

[0] Bacterial Pustule *(Xanthomonas phaseoli* var. *sojensis)*

[0] Bacterial Blight *(Pseudomonas glycinea)*

[0] Wildfire *(Pseudomonas tabaci)*

FUNGAL DISEASES:

[0] Brown Spot *(Septoria glycines)*

Frogeye Leaf Spot *(Cercospora sojina)*

[0] Race 1 [0] Race 2 [0] Race 3 [0] Race 4 [0] Race 5 [ ] Other *(Specify)* _____

[0] Target Spot *(Corynespora cassiicola)*

[0] Downy Mildew *(Peronospora trifoliorum* var. *manshurica)*

[0] Powdery Mildew *(Microsphaera diffusa)*

[0] Brown Stem Rot *(Cephalosporium gregatum)*

[0] Stem Canker *(Diaporthe phaseolorum* var. *caulivora)*

19. DISEASE REACTION: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant) (Continued)

FUNGAL DISEASES: (Continued)

[0] Pod and Stem Blight *(Diaporthe phaseolorum* var; *sojae)*

[0] Purple Seed Stain *(Cercospora kikuchii)*

[0] Rhizoctonia Root Rot *(Rhizoctonia solani)*

Phytophthora Rot *(Phytophthora megasperma* var. *sojae)*

[2] Race 1 [2] Race 2 [2] Race 3 [1] Race 4 [1] Race 5 [2] Race 6 [2] Race 7

[2] Race 8 [2] Race 9 [2] Other *(Specify)* 10-11, 13, 15, 17, 21, 23, and 24

VIRAL DISEASES:

[0] Bud Blight (Tobacco Ringspot Virus)

[0] Yellow Mosaic (Bean Yellow Mosaic Virus)

[0] Cowpea Mosaic (Cowpea Chlorotic Virus)

[0] Pod Mottle (Bean Pod Mottle Virus)

[0] Seed Mottle (Soybean Mosaic Virus)

NEMATODE DISEASES:

Soybean Cyst Nematode *(Heterodera glycines)*

[0] Race 1 [0] Race 2 [1] Race 3 [0] Race 4 [ ] Other *(Specify)* _____

[0] Lance Nematode *(Hoplolaimus Colombus)*

[0] Southern Root Knot Nematode *(Meloidogyne incognita)*

[0] Northern Root Knot Nematode *(Meloidogyne Hapla)*

[0] Peanut Root Knot Nematode *(Meloidogyne arenaria)*

[0] Reniform Nematode *(Rotylenchulus reniformis)*

[ ] OTHER DISEASE NOT ON FORM *(Specify):* _____

20. PHYSIOLOGICAL RESPONSES: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant)

[2] Iron Chlorosis on Calcareous Soil

[ ] Other *(Specify)* _____

21. INSECT REACTION: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant)

[0] Mexican Bean Beetle *(Epilachna varivestis)*

[0] Potato Leaf Hopper *(Empoasca fabae)*

[0] Other *(Specify)* _____

22. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED.

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant Shape	Williams 79	Seed Coat Luster	Williams 79
Leaf Shape	Williams 79	Seed Size	AgriPro 25
Leaf Color	Williams 79	Seed Shape	AgriPro 26
Leaf Size	AgriPro 26	Seedling Pigmentation	Williams 79

23. GIVE DATA FOR SUBMITTED AND SIMILAR STANDARD VARIETY: Paired Comparison Data

VARIETY	NO. OF DAYS MATURITY	PLANT LODGING SCORE	CM PLANT HEIGHT	LEAFLET SIZE		SEED CONTENT		SEED SIZE G/100 SEEDS	NO. SEEDS/ POD
				CM Width	CM Length	% Protein	% Oil		
Submitted	128	2	99	ND	ND	39.0	22.6	18	ND
Williams 82 Name of Similar Variety	128	2	107	ND	ND	38.9	23.0	18	ND

PUBLICATIONS USEFUL AS REFERENCE AIDS FOR COMPLETING THIS FORM:

1. Caldwell, B.E., ed. 1973. Soybeans: Improvement, Production, and Uses. Amer. Soc. Agron. Monograph No. 16.
2. Buttery, B.R. and R.I. Buzzell. 1968. Peroxidase activity in seeds of soybean varieties. Crop Sci., 8: 722-725.
3. Hymowitz, T. 1973. Electrophoretic analysis of SBTI-A_2 in the USDA soybean germplasm collection. Crop Sci., 13: 420-421.
4. Payne, R.C. and L.F. Morris. 1976. Differentiation of soybean cultivars by seedling pigmentation patterns. J. Seed Technol. 1: 1-19.

"EXHIBIT E"

Nickerson American Plant Breeders, through various changes in corporate structure and purchases, are sole owners of the assets of the previous companies North American Plant Breeders and AgriPro, Inc. The ownership comprises all the soybean genetic material, including the variety AP 3977.

Wayne R. Ellingson
Signature

Wayne R. Ellingson

Director of Soybean Research